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TITLE: Method and system for distributing a plurality of software products, and
limiting access thereto

Abstract Text (1):
A technique for mass distributing software products, especially integrated circuit
design tools and design libraries, while allowing only a selected portion of the
products to be loaded onto and used on a computer. One or more volumes of CD-ROM
contains one or more software products, each of which are encrypted with a key code.
The CD-ROMs are mass distributed to customers. A separate configuration file,
uniquely configured for each customer, contains a list of only the selected portion
of software products, and contains the key codes for decrypting only those products.
A loader module is provided for controlling the decryption and loading of only the
selected portion of products, based on information in the configuration file. Each
software product is hierarchically arranged by class, file set and file, and files
may be shared between products.

Brief Summary Text (2):
The present invention relates to techniques for distributing software products on a
mass storage media device such as a CD-ROM.

Brief Summary Text (4):
Electronic Computer Aided Design (ECAD) systems have become important in the design
of electronic circuits, and are virtually indispensable in the design of
semiconductor chips. A typical ECAD system comprises a computer workstation loaded
with a suite of software-based design tools and software-based design libraries. The
designer (user) uses these tools and libraries to create a coded layout of a device,
and forwards the code for the design to a manufacturer (vendor) via suitable means,
such as magnetic tape or the like. Using the tape, the manufacturer is able to
fabricate a physical device based on the information contained on the tape. The
manufacturer is typically also the purveyor of the software-based design tools and
design libraries, although sometimes a third party becomes involved. Together, the
design tools and design libraries are referred to as software "products".

Brief Summary Text (10):
In contrast to tape storage media devices, a CD-ROM is a mass storage media device
which offers several advantages. First, a CD-ROM can hold about 680 megabytes of
data. Second, the cost-per-byte is lower for moderate levels of distribution (over
100 copies) than tape media.

Brief Summary Text (11):
Recently, software vendors have begun to distribute software products on CD-ROM. The
CD-ROM, however, is formatted according to an ISO-9660 format.

Brief Summary Text (13):
However, the distribution of products on CD-ROM for operating systems such as UNIX
is difficult because the ISO-9660 format does not provide inherent protection for
the contents of the CD-ROM. This becomes a problem (e.g.) when software products
having restrictions on distribution are involved. As such, the use of CD-ROMs to
distribute a plurality of software products is not practical, if the customer
receiving the plurality of products is not licensed for all of the products.
Moreover, the ISO-9660 format does not preserve the original UNIX-based file dates

and file permissions of the products. In the UNIX environment, it is essential that
permission information be preserved. Permission information relates to whether a
given file can be written, read or executed.

Brief Summary Text (14):
To overcome some of these disadvantages and to take advantage of software
distribution on CD-ROM, some vendors have attempted to control the unauthorized use
of products on CD-ROM by performing "run-time authorization checking." One form of
this checking is referred to as "network licensing." This preventive measure,
however, is not practical for some software products and especially for data files
which are intended to be used by external software products which are not configured
for run-time authorization checking.

Brief Summary Text (15):
Alternatively, software vendors have attempted to control the unauthorized use of
products by sending each product on a separate CD-ROM. This is a more expensive and
logistically difficult approach in that each customer must be sent a different set
of CD-ROMs. Furthermore, each CD-ROM must be mastered separately, thus incurring the
CD-ROM mastering set-up charge for each customer shipment. As such, it is not
practical to limit the production of a CD-ROM to only a single software product.

Brief Summary Text (16):
Conventional apparatus and processes for the provision of multiple products on
CD-ROM is not easy or cost effective. An improved software distribution apparatus
and process is of key importance to the distribution of software products on CD-ROM
and/or other mass storage devices.

Brief Summary Text (19):
According to the invention, a technique is provided that allows a software vendor to
distribute multiple software products on one or more mass-produced volumes of a mass
storage media device. The present invention allows each customer to load only a
specified portion of the products, namely those products which they are licensed
(e.g.) to use.

Brief Summary Text (20):
The apparatus of the present invention includes one or more volumes of a storage
media device. Every customer receives the same volume set, which contains the entire
plurality of software products. The number of volumes of the storage media device is
dependant on the number of software products to be distributed by the vendor. In one
embodiment, the storage media device is a CD-ROM which can be readily mass produced
in a cost effective manner.

Brief Summary Text (21):
According to an aspect of the invention, the storage media devices comprise one or
more software products. Each of the software products is encrypted with a unique key
code such that the customer can not directly load the software products from the
storage media devices onto their computer (CPU).

Brief Summary Text (23):
The site configuration file includes a list of the software products that the
customer is licensed to use. The site configuration file also includes a list of
encryption key codes for each of the licensed products. The site configuration file
may also include a list of the authorized CPU-IDs. The list of CPU-IDs provides a
data base from which to ensure that only licensed computers (e.g., workstations) are
being loaded with the licensed software products.

Brief Summary Text (24):
The apparatus further comprises a "loader module". The loader module exercises
control over the loading of software products from the volumes of CD-ROM, and is
preferably stored on each of the volumes. The loader module is configured to
determine whether the host computer is licensed for loading the software products.
This is performed by reading the site configuration file to verify that the CPU-ID
of the host machine is contained in the CPU-ID list. Once this verification is made,
the loader module is then configured to retrieve the encryption keys from the site
configuration file. Using these encryption keys, the loader module is configured to

decrypt and then <u>load</u> onto the licensed computer only those software products on the storage media devices that the customer is licensed to use.

<u>Brief Summary Text</u> (25):
Another feature of the present invention is that encryption keys for successive releases of a particular software product are re-used such that a customer may be shipped a new volume set of storage media devices and re-use his old site configuration file to <u>load the updated</u> software products. This simplifies mass distribution of software products, because only the site configuration files must be uniquely generated and shipped separately for each customer. The software products themselves are simply duplicated and shipped to every customer.

<u>Brief Summary Text</u> (26):
Another feature of the present invention is that new encryption keys are used for new software products. Thus, combinations of "old" and "new" software products may co-exist on one <u>CD-ROM</u>. For existing customers, only those who license the newly-included software products will need to be shipped a new site configuration file.

<u>Brief Summary Text</u> (27):
Another feature of the present invention is that the software vendor may license third-party vendors to distribute one or more products to their customers. In this situation, the volumes of <u>CD-ROM</u> are sent to the third-party vendor in the same manner as described above. However, the software vendor provides the third-party vendor with the capability of creating its own site configuration files. The third-party vendor then creates a site configuration file for each of its customers. The present invention allows the software vendor to restrict the ability of third-party vendor from creating site configuration files that would "unlock" every software product on the <u>CD-ROM</u>. In this way, the software vendor can allow a third-party distributer to distribute only a portion of the products contained on the volumes of <u>CD-ROM</u>.

<u>Brief Summary Text</u> (28):
Others have attempted to exercise control over the distribution of multiple software products using run time authorization techniques. For various reasons, these techniques do effectively restrict access to un-licensed products. The technique of the present invention utilizes <u>load</u> time authorization. One effect of this is that the customer, in essence, does not even know that the un-licensed products exist on the volume(s) of <u>CD-ROM</u> in his possession.

<u>Drawing Description Text</u> (3):
FIG. 2 is a high level block diagram showing the architecture of an encrypted <u>CD-ROM</u> storage device.

<u>Drawing Description Text</u> (7):
FIGS. 6A and 6B is a high level flow chart showing the operation of the <u>loader</u> program.

<u>Drawing Description Text</u> (8):
FIG. 7 is a high level flow chart showing the process for configuring the encrypted <u>CD-ROM</u> storage device.

<u>Drawing Description Text</u> (9):
FIG. 8 is a high level block diagram showing the architecture of the <u>CD-ROM</u> mastering tool module which is used to generate the <u>CD-ROM</u> master tape.

<u>Drawing Description Text</u> (10):
FIG. 9 is a high level flow showing the operation of the <u>CD-ROM</u> mastering tool module.

<u>Drawing Description Text</u> (11):
FIG. 10 is a high level block diagram showing the architecture of the <u>CD-ROM</u> mapper module.

<u>Drawing Description Text</u> (12):

FIGS. 11A-11C are a high level flow chart showing the operation of the CD-ROM mapper module.

Drawing Description Text (13):
FIG. 12 is a high level block diagram showing the architecture of the CD-ROM master module.

Drawing Description Text (14):
FIG. 13 is a high level flow chart showing the operation of the CD-ROM master module.

Detailed Description Text (2):
The present invention relates to a technique for allowing a software vendor to distribute multiple software products to a customer for use with an Electronic Computer-Aided Design (ECAD) system. One feature of the present invention is that the customers can only load those products for which they are licensed to use. This feature allows a software vendor to mass distribute multiple software products while allowing customers to load only certain software products. Another feature of the present invention is that customers can only load products onto a licensed ECAD system. This feature allows a software vendor to control which ECAD system the software products are being loaded on. As will be appreciated from the following detailed description, the present invention provides many other features and advantages heretofore unavailable in conventional software distribution apparatus and methods.

Detailed Description Text (3):
FIG. 1 shows a generalized "user" ECAD system 102, which will be loaded with certain software products. ECAD system 102 may take a number of forms and configurations. By way of example only, ECAD system 102 may be a Sun Microsystem SPARC (trademark) workstation operating with a UNIX (trademark) operating system.

Detailed Description Text (4):
The ECAD system 102 of the type described above generally comprises a CPU 104, a memory 106 and a hard disk 108. The ECAD system 102 further comprises a CD-ROM reader device 110 and an additional information retrieval device 112, such as a floppy disc drive or tape reader. As will be further described herein, the CD-ROM reader 110 is used to load the "software products" onto the ECAD system 102. Not shown is a tape drive, which would be used to transmit the finalized design to the chip manufacturer. For purposes of this discussion, the chip manufacturer is the principal purveyor of the software products.

Detailed Description Text (6):
The encrypted mass storage device 126 generally contains the software products for which the software vendor desires to mass distribute to one or more customers. Although only one mass storage device 126 is depicted, several mass storage media devices will typically be necessary to distribute all of the vendor's software products. As will be more fully described herein, each software product on the mass storage device 126 is encrypted with a key code. This feature requires that the customer must be given the keys codes in order to load particular products from the mass storage media device 126 onto the ECAD workstation 102.

Detailed Description Text (7):
The site configuration file 128 is generally provided to give each customer the key codes and to allow the customer to load their licensed products onto the ECAD system 102. The site configuration file 128 is therefore unique to each customer. Preferably, the site configuration file is also encrypted, to prevent the customer from gaining access to software products he is not authorized to use. As will be more fully described herein, the site configuration file is provided with a listing of the software products licensed to the customer and the corresponding key codes which are used to "unlock" the software products on mass storage device 126. The site configuration file 128 is further provided with a listing of the particular ECAD systems 102 (i.e., CPU IDs) for which the licensed software products are authorized to be loaded on.

Detailed Description Text (8):

Preferably, the encrypted mass storage device 126 is that of an encrypted CD-ROM (referred to herein as encrypted CD-ROM storage device 126). As such, the ECAD system 102 must be configured with the CD-ROM reader device 110. Although the present invention will be described with reference to an encrypted CD-ROM, other mass storage devices presently known or developed in the future may be configured according to the techniques of the present invention. By way of example only, such other storage media devices include, but are not limited to floppy disks, hard disks and optical disks. If other mass storage devices are used, the CD.sub.-- ROM reader 110 of the ECAD system 102 must be replaced with an appropriate device.

Detailed Description Text (10):
The architecture and method of operation of the encrypted CD-ROM storage device 126 and the site configuration file 128 will be described first,

Detailed Description Text (11):
from the viewpoint of the user. Thereafter, the architecture and process for configuring both the encrypted CD-ROM storage device 126 and the site configuration file 128 will be described.

Detailed Description Text (12):
FIG. 2 shows a high level block diagram of the architecture of the encrypted CD-ROM storage device 126. The CD-ROM storage device 126 includes a README file 202. README file 202 contains information relating to the software vendor and use of the software products.

Detailed Description Text (13):
CD-ROM storage device 126 further comprises a volume ID file 204. Volume ID file 204 is simply a data file that identifies the volume of CD-ROM. A software vendor having multiple products to distribute may require multiple volumes of CD-ROM (i.e. volumes 1-6).

Detailed Description Text (14):
CD-ROM storage device 126 further comprises a look-up file 206. Preferably, the look-up file 206 is encrypted. As will be described more fully herein, look-up file 206 generally provides a listing of all the software products and other information necessary to load the licensed software products onto the customer's ECAD system 102. The look-up file 206 is common to each volume of CD-ROM.

Detailed Description Text (15):
CD-ROM storage device 126 further comprises a file set 208. The file set is preferably created using the UNIX "TAR" utility, and is preferably encrypted. The file set list 208 provides a location in which to store the contents and other pertinent information (such as size and permission data) of each file set. As will be described more fully herein, each file set is encrypted with a key code such that the customer can not load particular file sets without the proper key code. Thereafter, each file set is operated on by the UNIX utility TAR to compile each of the files for a given file set.

Detailed Description Text (16):
CD-ROM storage device 126 further comprises a loader module (program) 210. As will be more fully described herein, the loader module 210 is generally configured (1) to read the site configuration file 128 to ascertain whether the CPU-ID of the particular ECAD system 102 is licensed, (2) upon verification of the ECAD system 102 CPU-ID, to read the encryption key codes from the site configuration file 128, and (3) to "unlock" the software products (one software product is made up of one or more file sets stored in file set list 208) corresponding to the key codes. The loader program is further configured to load the "unlocked" file sets onto the ECAD system 102.

Detailed Description Text (17):
FIG. 3 shows a pictorial illustration of the structure of the look-up file 206. The look-up file 206 first comprises a product name list 302. Product name list 302 is a listing of software products being distributed on all volumes of the CD-ROMs. In the illustration of FIG. 3, two products are shown; Product "I" and Product "II".

Detailed Description Text (20):
Look-up file 206 is further configured with a file set list 306. File set list 306
is a listing of what file sets make up a given class. In the illustration of FIG. 3,
class A is made-up of FileSet1 and FileSet2. As will be described more fully herein,
a class may be made up of one or more file sets, the only restriction being that for
each file set (1) the combined size of all the files that make-up the file set not
exceed some maximum percentage of the storage capacity of the CD-ROM storage device
126 (10 percent in one embodiment) and (2) that each file within a file set share
the same root path.

Detailed Description Text (21):
File sets are sized to a specified maximum fraction of the capacity of a single
CD-ROM volume (about 10% of 680 megabytes). If the total size of all the files
within a file set is greater than this maximum value, then prior to the actual
configuration of the CD-ROM, the file set is divided into multiple file sets until
the size of each of the file sets is within the specified value. This process will
be described more fully herein. Additionally, in the UNIX environment it is
important to ensure that the files in a given file set share the same root path.

Detailed Description Text (24):
Look-up file 206 is further configured with a volume no. list 312. Volume no. list
312 identifies on which volume of CD-ROM the contents of a particular file set are
located.

Detailed Description Text (26):
File set 208 is further configured with a file date list 408. File date list 408
identifies the original date of the creation of the file as opposed to the date that
the CD-ROM was created. Knowledge of the file date of a file allows the vendor to
trace any problems that may arise in the operation of the software product.

Detailed Description Text (27):
File set 208 further comprises a file permission list 410. File permission list 410
is provided so that the vendor can establish the file set permissions such as write,
read, and execute. Unlike the conventional ISO-9660 format CD-ROM, the present
invention preserves original file permissions and file dates.

Detailed Description Text (28):
File set 208 is further configured with a file size list 412. File size list 412
identifies the size of the file. This information may be useful for a variety of
reason. By way of example only, it may be useful in informing the customer how much
space is necessary in order to load a given file set.

Detailed Description Text (32):
The CPU-ID file 504 is a list containing the CPU-ID for each ECAD system 102 the
customer is licensed to load the software products on. As will be described more
fully herein, at the beginning of the loading process, the present invention first
verifies that a licensed ECAD system 102 (FIG. 1) is attempting to load the software
products. The CPU-ID list 504 will vary from customer to customer.

Detailed Description Text (33):
The key code list 506 is a list containing all key codes necessary to decrypt the
file sets which make-up the licensed products in the product list 502. The key code
list 506 will also typically vary from customer to customer. As will be described
more fully herein, for each new release of CD-ROM (i.e. completely revised set of
volumes of CD-ROMs), the key codes from the previous release are re-used so that it
is not necessary to send a new site configuration file 128 to a customer when the
vendor sends a new release of software on CD-ROM. The site configuration file is
preferably encrypted.

Detailed Description Text (34):
FIGS. 6A and 6B show a high level flow chart of the operation of the loader module
210 (FIG. 2). A start block 602 initiates operation of the loader module 210.
Control is then passed along a logic path 604 to an operational block 606.

Detailed Description Text (35):

As shown by operational block 606, the loader module 210 is first configured to
decrypt the site configuration file 128. Control is then passed along a logic path
608 to an operational block 610.

Detailed Description Text (36):
As shown by operational block 610, the loader module 210 is then configured to read
the CPU-ID list 504 of the site configuration file 128. Control is then passed along
a logic path 612 to an decisional block 614.

Detailed Description Text (37):
As shown by decisional block 614, the loader module 210 is then configured to access
the running host CPU-ID and determine whether this CPU-ID is in the list of licensed
CPU-IDs. If the host CPU-ID is not licensed (i.e. not in the CPU-ID list 504),
control is passed along a logic path 616 to an operational block 618 where operation
of the loader module 210 is terminated. A display error message may be generated
instructing the customer that the current machine is not licensed to load the
software products. If, however, the host CPU-ID is licensed, control is then passed
along a logic path 620 to an operational block 622.

Detailed Description Text (38):
As shown by operational block 622, the loader module 210 is then configured to read
and decrypt the look-up file 206 stored on the CD-ROM 126. Control is then passed
along a logic path 624 to an operational block 626.

Detailed Description Text (39):
As shown by operational block 626, the loader module 210 is then configured to read
the product list 502 on the site configuration file 128. Control is then passed
along a logic path 628 to an operational block 630.

Detailed Description Text (40):
As shown by operational block 630, the loader module 210 is then configured to
display to the customer a list of the products that it is licensed to load and
prompt the customer for a selection. This is performed by comparing the list of
products contained in the product list 502 with the list of products contained in
the look-up file 206. Control is then passed along a logic path 632 to an
operational block 634.

Detailed Description Text (41):
As shown by operational block 634, the loader module 210 is then configured to read
the products selected by the customer. Control is then passed along a logic path 636
to an operational block 638.

Detailed Description Text (42):
As shown by operational block 638, the loader module 210 is then configured to
determine what classes make-up the first product selected by the customer
(identified as "current product" in FIG. 6). Control is then passed along a logic
path 640 to an operational block 642.

Detailed Description Text (43):
As shown by operational block 642, the loader module 210 is then configured to
retrieve the key codes from the key code list 506 for each class that make up the
current product. As discussed before, the key codes in the key code list 506 are
cross-referenced to a particular class. As such, knowledge of what classes make up a
given product also reveals which key codes are necessary to load the file sets for
each product. Control is then passed along a logic path 644 to an operational block
646.

Detailed Description Text (44):
As shown by operational block 646, the loader module 210 is then configured to
retrieve the list of file set names from the look-up file 206 that make-up a given
class. Control is then passed along a logic path 648 to an operational block 650.

Detailed Description Text (45):
As shown by operational block 650, the loader module 210 is then configured to
decrypt each of the file sets in the file set list 208 using the key codes retrieved

from the key code list 506 and the file set names retrieved from the look-up file 206. Thereafter, the loader module 210 is further configured to "untar" each file set. Control is then passed along a logic path 652 to an operational block 654.

Detailed Description Text (46):
As shown by operational block 654, the loader module 210 is then configured to prompt the customer for the location where to load the file sets that make up the current product. Control is then passed along a logic path 656 to an operational block 658.

Detailed Description Text (47):
As shown by operational block 658, the loader module 210 is then configured to load each of the file sets to the designated location. Control is then passed along a logic path 660 to a decisional block 662.

Detailed Description Text (48):
As shown by decisional block 662, the loader module 210 is then configured to determine whether any more products need to be loaded. If additional products need to be loaded, control is returned along a logic path 664 to operational block 638 where the next product is loaded. If all products selected by the customer have been loaded, control is passed along a logic path 666 to an operational block 668 where operation of the loader module 210 is terminated.

Detailed Description Text (49):
Heretofore described has been the physical architecture of the encrypted CD-ROM storage device 126 and the site configuration file 128. Also described has been the loader module 210 which loads the software products from the encrypted CD-ROM storage device 126 to the user's ECAD system 102 using the site configuration file 128. Following is a description of the architecture and process for the vendor generating the encrypted CD-ROM storage device 126 and the site configuration file 128.

Detailed Description Text (50):
FIG. 7 shows a high level flow chart of the process for creating the encrypted CD-ROM storage device 126. Shown is a CD-ROM mastering tool module 702. CD-ROM mastering tool module 702 is provided to create a master tape for each volume of CD-ROM. As will be more fully described herein, CD-ROM mastering tool module 702 is configured to automatically determine the number of volumes of CD-ROM necessary based on the number and complexity of software products to be mass-distributed.

Detailed Description Text (51):
As shown by block 704, the master tape generated by the CD-ROM mastering tool module 702 is sent to a CD-ROM manufacturer. The CD-ROM manufacturer utilizes the master tapes to generate one or more volumes of CD-ROM storage device 126.

Detailed Description Text (52):
FIG. 8 shows a high level block diagram of the architecture of the CD-ROM mastering tool module 702. As shown, the CD-ROM mastering tool module 702 first comprises a scheduler module 802. Scheduler module 802 is configured to (1) generate a job definition list (not shown) indicative of the products to be loaded onto the CD-ROM storage device and (2) to assign a serial number. The job definition list is a list of the product names and corresponding directory and/or file names that make-up the product as well as the root path location of the directories and/or files.

Detailed Description Text (53):
The CD-ROM mastering tool module 702 further comprises a CD-ROM mapper module 804. As will be described more fully herein, the CD-ROM mapper module 802 is generally provided to read the job definition list from the scheduler 802 and to configure each of the directories and/or files that make-up a product into a structure more compatible for mass distribution.

Detailed Description Text (54):
The CD-ROM mastering tool module 702 further comprises a CD-ROM master module 806. The CD-ROM master module 804 is generally provided to configure the output of the CD-ROM mapper module 804 such that each of the file sets is in the proper ISO-9660

format.

Detailed Description Text (55):
FIG. 9 shows a high level flow chart of the inter-operation of the scheduler module
802, the CD-ROM mapper module 804, the CD-ROM master module 806.

Detailed Description Text (56):
The operation of CD-ROM mastering tool module 702 first begins with operation of
scheduler module 802. Scheduler module 802 generates a job definition list which in
inputted to the CD-ROM mapper module 804. As described before, the job definition
list is simply a list of all the products to be mass distributed and the directory
and/or file names that make-up the products. The location of the directories and/of
files (i.e location of directories and/or files within the vendor's computer
systems) is also provided in the job definition list.

Detailed Description Text (58):
The look-up file 902 is an un-encrypted version of the look-up file 206 stored on
the CD-ROM storage device 126. Look-up file 206 was previously discussed with
reference to FIGS. 2 and 3.

Detailed Description Text (61):
Thereafter, look-up file 902, product look-up file 904, MPS file 906, and README
file 202 are outputted to the CD-ROM master module 806. The CD-ROM master module 804
operates on these data files to generate one or more master tapes. Each master tape
is representative of one volume of CD-ROM.

Detailed Description Text (62):
Each master tape has configured thereon the following five files: the file set list
208, the look-up file 206, loader program 210, README file 202, and the volume ID
file 204. As discussed with reference to FIGS. 2 and 3, the look-up file 206, loader
program 210, and README file 202 are common to each volume of CD-ROM.

Detailed Description Text (63):
FIG. 10 shows a more detailed block diagram of the architecture of the CD-ROM mapper
module 804. CD-ROM mapper module 804 first comprises a job definition module 1002.
Job definition module 1002 is generally configured to read the job definition file
provided by the scheduler 802. The job definition file includes a list of the
product names that the vendor desires to mass distribute and the directories and/or
files (with root path locations) that make-up the products.

Detailed Description Text (64):
The CD-ROM mapper module 804 further comprises a partition module 1004. As will be
described in more detail with reference to FIG. 11, the partition module 1104 is
generally configured to take the job definition file and (1) organize the file sets
into a set of distinct classes that make-up a given product into classes and assign
a separate encryption key to each class, (2) generate the MPS file 906 that contains
a listing of the file sets with the corresponding files that make-up each file set,
(3) generate the look-up file 902 and product look-up file 904, (4) generate the
README file 202, (5) output the MPS file 906, look-up file 902, product look-up file
904 and README file 202 to the CD-ROM master module 806, and (6) to output another
copy of the product look-up file to a site configuration module (to be described) to
be used for creating the site configuration file 128.

Detailed Description Text (65):
FIGS. 11A-11C show a high level flow chart of the operation of the CD-ROM mapper
module 804. A start block 1102 initiates operation of the CD-ROM mapper module 804.
Control is then passed to an operational block 1104.

Detailed Description Text (66):
As shown by operational block 1104, the CD-ROM mapper module 804 is first configured
to read the job definition file provided by the scheduler 802. As described above,
the job definition file includes all of the products the vendor desires to mass
distribute and the corresponding directory and/or files that make-up the product.
Control is then passed to an operational block 1106.

Detailed Description Text (67):
As shown by operational block 1106, the CD-ROM mapper module 804 is then configured
to verify that all the directories and/or files for each product can actually be
accessed. This step is necessary to ensure that some part of the vendor network is
not "down" and thus unable to transmit the directories and/or files. Control is then
passed to an operational block 1108.

Detailed Description Text (68):
As shown by operational block 1108, the CD-ROM mapper module 804 is then configured
to access the directories and/or files and construct one or more directory trees.
Control is then passed to an operational block 1110.

Detailed Description Text (69):
As shown by operational block 1110, the CD-ROM mapper module 804 is then configured
to examine each directory tree and "mark" each of the files contained therein with
the name of the product that it belongs to. The product names are maintained as a
linked-list attached to each file node in the directory tree. Control is then passed
to an operational block 1112.

Detailed Description Text (70):
As shown by operational block 1112, the CD-ROM mapper module 804 is then configured
to examine each of the directory trees to (1) determine the number of classes of
files that exist and (2) to assign an encryption key code to each class. A class is
defined as a group of non-overlapping files that make-up a product. For example, if
one file is shared by two or more products, then that file becomes a class of its
own. Another example would be if ten files belong only to one product, then these
ten files would become a single class. Control is then passed to an operational
block 1114.

Detailed Description Text (71):
As shown by operational block 1114, the CD-ROM mapper module 804 is then configured
to examine each file and "mark" it with the name of the class that the file belongs
to. At this point, the CD-ROM mapper module 804 is also configured to make each
class a file set. Control is then passed to an operational block 1116.

Detailed Description Text (72):
As shown by operational block 1116, the CD-ROM mapper module 804 is then configured
to examine each file set to ensure that the files within the file set share the same
root path. If the files within a file set do not share the same root path, the
CD-ROM mapper module 804 is configured to "break-up" the file set into one or more
file sets such that all the files within a given file set share the same root path.
If this occurs, the CD-ROM mapper module 804 is further configured to mark each of
the additional file sets with the same class name and encryption key code. Control
is then passed to an operational block 1118.

Detailed Description Text (73):
As shown by operational block 1118, the CD-ROM mapper module 804 is then configured
to re-examine each file set to ensure that the cumulative size of all the files
within each file set does not exceed a predetermined size. In the preferred
embodiment, this predetermined size is approximately 10 percent of the storage
capacity of the CD-ROM storage device 126. If the size of a file set is too large,
the CD-ROM mapper module 804 is configured to "break-up" the file set into one or
more file sets such that each of the file sets are within the specified size
restriction. If this occurs, the CD-ROM mapper module 804 is also configured to mark
each of the additional file sets with the same class name and encryption key code.
Control is then passed to an operational block 1120.

Detailed Description Text (74):
As shown by operational block 1120, the CD-ROM mapper module 804 is then configured
to assign each file set to a particular volume of CD-ROM. The CD-ROM mapper module
804 examines each file set to determine whether it can fit within the size
constraints of the current volume CD-ROM. If it can, the file set is assigned to
that volume of CD-ROM. If the file set is larger then the available space on the
current volume of CD-ROM, the CD-ROM mapper module 804 is configured to create a new
volume of CD-ROM and assign the file set to that volume of CD-ROM. This process

continues until each and every file set has been assigned to a volume of CD-ROM.
Control is then passed to an operational block 1122.

Detailed Description Text (75):
As shown by operational block 1122, the CD-ROM mapper module 804 is then configured
to generate the single MPS file 906. The MPS file 906 is a list of all file sets and
the corresponding files that belong to it. The file date and permission data
corresponding to each file as well as the CD-ROM volume number that the file set has
been assigned is also compiled. Control is then passed to an operational block 1124.

Detailed Description Text (76):
As shown by operational block 1124, the CD-ROM mapper module 804 is then configured
to generate the look-up file 902 and the product look-up file 904. Control is then
passed to an operational block 1126.

Detailed Description Text (77):
As shown by operational block 1126, the CD-ROM mapper module 804 is then configured
to generate the README file 202. Control is then passed to an operational block
1128.

Detailed Description Text (78):
As shown by operational block 1128, the CD-ROM mapper module 804 is then configured
to output the MPS file 906, look-up file 902, product look-up file 904, and the
README file 202 to the CD-ROM master module 806. Control is then passed to an
operational block 1130 where operation of the CD-ROM mapper module 804 is concluded.

Detailed Description Text (79):
FIG. 12 shows a more detailed block diagram of the architecture of the CD-ROM master
module 806. As shown, the CD-ROM master module 806 generally comprises a generate
TAR file set module 1202, an encryption key module 1204, an encryption look-up file
module 1205, and a tape generation module 1206.

Detailed Description Text (83):
The tape generation module 1206 is provided to create a master tape for each volume
of CD-ROM in the ISO-9660 format. Preferably, the tape generation module utilizes
the "Young Minds" software to perform this function. The Young Minds software is
well known in the art and as such, a detailed description will not be provided
herein.

Detailed Description Text (84):
FIG. 13 shows a high level flow chart of the operation of the CD-ROM master module
806. Operation is initiated by an operational block 1302. Control is then passed
along a logic path 1304 to an operational block 1306.

Detailed Description Text (85):
As shown by operational block 1306, the CD-ROM master module 806 is then configured
to read the MPS file 906 and retrieve all file sets and corresponding files that
have been assigned to the current volume of CD-ROM (on first pass, current
volume=volume 1). Control is then passed along a logic path 1308 to an operational
block 1310.

Detailed Description Text (86):
As shown by operational block 1310, the CD-ROM master module 806 is then configured
to run the UNIX TAR utility to compile the files that make up each file set. Control
is then passed along a logic path 1312 to an operational block 1314.

Detailed Description Text (87):
As shown by operational block 1314, the CD-ROM master module 806 is then configured
to encrypt each file set with the corresponding key code. This information is
retrieved from the product look-up file 904 where each class has been assigned a key
code and knowledge of what file sets make-up a class is available. Control is then
passed along a logic path 1316 to an operational block 1318.

Detailed Description Text (88):
As shown by operational block 1318, the CD-ROM master module 806 is then configured
to encrypt a copy of the look-up file 902. Control is then passed along a logic path
1320 to an operational block 1322.

Detailed Description Text (89):
As shown by operational block 1322, the CD-ROM master module 806 is then configured
to read a copy of the loader program 210. Control is then passed along a logic path
1324 to an operational block 1326.

Detailed Description Text (90):
As shown by operational block 1326, the CD-ROM master module 806 is then configured
to generate a volume ID file 204 for the current volume of CD-ROM. Control is then
passed along a logic path 1328 to an operational block 1330.

Detailed Description Text (91):
As shown by operational block 1330, the CD-ROM master module 806 is then configured
to output the file set list 208, look-up file 206, volume ID file 204, README file
202, and loader program 210 to the tape generation module 1206. Although not shown,
the tape generation module 1206 is then configured to generate a master tape for the
current volume of CD-ROM. Control is then passed along a logic path 1332 to a
decisional block 1334.

Detailed Description Text (92):
As shown by decisional block 1334, the CD-ROM master module 806 is then configured
to determine whether any more volumes of CD-ROM need to be generated. If additional
volumes of CD-ROM need to be generated, then control is returned along a logic path
1336 to operational block 1304 where the current volume of CD-ROM is incremented to
the next volume. However, if no additional volumes of CD-ROM need to generated, then
control is passed along a logic path 1138 to an operational block 1340 where
operation of the CD-ROM master module 806 is terminated.

Detailed Description Text (93):
At this point, each of the CD-ROM master tapes (one for each volume of CD-ROM) can
now be sent to a CD-ROM manufacturer (such as the 3M Corporation or the Sony
Corporation) where the CD-ROMs are fabricated.

Detailed Description Text (98):
As shown by operational block 1506, the site configuration module 1402 is first
configured to read the customer data base file 1404 and generate the product list
502 and the CPU-ID list 504. As described with reference to FIG. 5, the product list
502 is a list of licensed software products while the CPU-ID list 504 is a list of
the CPU-IDs indicative of which machines the customer is licensed to load the
software products on. Control is then passed along a logic path 1508 to an
operational block 1510.

Detailed Description Text (100):
As denoted by operational block 1514, the site configuration module 1402 is then
configured to load the product list 502, CPU-ID list 504, and the key code list 506
onto a storage medium such as a floppy disk. The floppy disk containing the site
configuration file 128 is then sent to the customer along with the various volumes
of the CD-ROM storage device 126. Control is then passed along a logic path 1516 to
an operational block 1518 where operation of the site configuration module 1402 is
concluded.

Detailed Description Text (103):
In the present invention, the third party vendor 1604 is provided with a revised
product look-up file. The revised product look-up file is a version of the product
look-up file 904 minus any products and/or encryption key codes that the software
vendor 1602 does not want the third party vendor 1604 to distribute. The third party
vendor 1604 is thereby restricted in the type of site configuration files 128 that
it can generate and distribute. As described heretofore, the third party vendor 1604
can then send to its customers (1) a copy of the software products on one or more
volumes of CD-ROM storage device 126 and (2) a unique site configuration file 128.

Detailed Description Text (105):
Inasmuch as files and/or file sets may be shared by different products, the "class" designation of intersecting files allows for only one instance of a file/file set to be written on the CD-ROM, which reduces the overall CD-ROM storage requirement. Each product contains a pointer designating the classes of files needed to completely describe the product.

Detailed Description Text (109):
Appendix 2, which is a code listing for CD Loader;

CLAIMS:

1. A system for distributing software products and limiting access thereto, comprising:

a first storage device including:

files, file sets, classes, and products; each of said file sets comprising at least one of said files; each of said classes comprising at least one of said file sets; each of said products comprising at least one of said classes; each of said products being assigned a different product encryption key code; and each of said classes belonging to each of said products being encrypted using the product's said assigned product encryption key code;

a common look-up file comprising (1) a list of said products contained in said first storage device, (2) a list of said classes in each of said products, and (3) a list of said file sets in each of said classes; and

a decryptor; and

a second storage device including a separate site configuration file containing a list of at least one class selected from said classes included in said first storage device, and at least one of said product encryption key codes;

wherein said decryptor is configured to:

(1) read said site configuration file to retrieve said at least one product encryption key code;

(2) read said site configuration file to retrieve said list of at least one selected class;

(3) read said storage device to decrypt said at least one selected class, using said at least one product encryption key code contained in said site configuration file, to produce at least one decrypted class; and

(4) load said at least one decrypted class onto a computer.

2. A system as claimed in claim 1, wherein said site configuration file includes a list of CPU-IDs, and said decryptor only loads said at least one decrypted class onto a computer having a CPU-ID that is included in said list of CPU-IDs.

7. A system as claimed in claim 6, wherein said first storage medium includes at least one CD-ROM.

8. A system as claimed in claim 7, wherein:

each of said at least one CD-ROM has a maximum storage capacity; and

each of said file sets has a size which is below approximately 10% of said maximum storage capacity.

12. A system for distributing software products and limiting access thereto, comprising:

(1) a computer;

(2) a first storage device which includes at least one CD ROM, said first storage device including:

(a) a file system including files, file sets, classes, and products; each of said file sets comprising at least one of said files; each of said classes comprising at least one of said file sets; and each of said products comprising at least one of said classes;

(b) a common look-up file comprising (i) a list of said products contained on said at least one CD-ROM, (ii) a list of said classes in each of said products, and (iii) a list of said file sets in each of said classes; and

(c) a loader; and

(3) a second storage device including a site configuration file that contains a list of at least one product selected from said file system;

wherein said loader is configured to:

(a) read said site configuration file to retrieve said list of at least one selected product;

(b) read said common look-up file to retrieve a list of at least one selected class that belongs to said at least one selected product;

(c) read said common look-up file to retrieve a list of at least one selected file set that belongs to said at least one selected class; and

(d) access said at least one volume of CD-ROM and load said at least one selected file set onto said computer.

15. A system as claimed in claim 14, wherein said loader determines whether a computer accessing said first storage medium has a CPU ID that is in said list of CPU-IDs.

16. A method of loading only selected software products onto a computer, comprising:

providing on a first storage medium:

files, file sets, classes, and products; each of said file sets comprising at least one of said files; each of said classes comprising at least one of said file sets; each product comprising at least one of said classes; and said classes being encrypted using encryption key codes; and

a common look-up file comprising (i) a list of said products contained on said at least one volume of CD-ROM, (ii) a list of said classes in each of said products, and (iii) a list of said file sets in each of said classes;

providing on a second storage medium a site configuration file containing a list of at least one product selected from said first storage medium, and at least one encryption key code selected from said encryption key codes;

reading said site configuration file to retrieve said at least one selected encryption key code, and said list of at least one selected product;

reading said common look-up file to retrieve a list of at least one selected class that belongs to said at least one selected product;

decrypting said at least one selected class, using said selected encryption key codes, to produce at least one decrypted class; and

loading said at least one decrypted class onto a computer.

18. A method as claimed in claim 17, further comprising a step of determining whether a computer onto which said decrypted classes may be <u>loaded</u> has a CPU-ID that is included in said list of CPU-IDs..